

CLAIMS

What is claimed is:

- 1 1. A method comprising:
2 labeling each received network packet with information identifying an
3 associated flow and a queue in which the packet will await transmission;
4 mapping each packet into one of a plurality of queues to await transmission
5 based on the packet's label identifiers;
6 scheduling the packets in the queues for transmission;
7 encapsulating the packets to form frames of uniform size; and
8 transmitting the uniform frames through a switch fabric to a next destination.
- 1 2. The method of claim 1, further comprising decapsulating a received frame of
2 encapsulated packets.
- 1 3. The method of claim 1, wherein labeling each packet to identify an associated
2 flow and a queue in which the packet will await transmission comprises determining a
3 flow associated with the packet based on the packet's source address and
4 destination address.
- 1 4. The method of claim 3, wherein labeling each packet to identify an associated
2 flow and a queue in which the packet will await transmission comprises determining a
3 flow associated with the packet based on protocols associated with the packet.

1 5. The method of claim 1, wherein labeling each packet to identify an associated
2 flow and a queue in which the packet will await transmission comprises determining a
3 traffic class to which the packet belongs.

1 6. The method of claim 1, wherein encapsulating the packets to form frames of
2 uniform size comprises encapsulating the packets to form frames of uniform size and
3 adding headers that contain information for decoding each frame back into packets.

1 7. The method of claim 1, wherein encapsulating packets to form frames of
2 uniform size comprises encapsulating packets to form frames of uniform size by
3 merging multiple packets into one frame using multiplexing.

1 8. The method of claim 1, wherein encapsulating packets to form frames of
2 uniform size comprises encapsulating packets to form frames of uniform size by
3 segmenting a packet and placing the packet segments into multiple frames using
4 segmentation and reassembly.

1 9. An apparatus comprising:
2 a classification element to label packets received from a network with
3 information identifying an associated flow and queue;
4 a mapping element coupled to the classification element to place the packets
5 into one of a plurality of queues based on the packet's label identifiers;
6 a scheduler coupled to the mapping element to schedule the packets in the
7 queues for transmission; and
8 an encapsulation element coupled to the scheduler to encapsulate the
9 scheduled packets into uniform size frames before the packets are transmitted
10 through a switch fabric to a next destination.

1 10. The apparatus of claim 9, further comprising an access unit coupled to the
2 classification element through a switch to provide access to communications from the
3 network.

1 11. The apparatus of claim 9, further comprising an adjunct unit to perform signal
2 processing functions.

1 12. The apparatus of claim 9, further comprising a switch coupled to the
2 encapsulation element to transmit the scheduled packets to the next destination
3 through the switch fabric.

1 13. An article of manufacture comprising:
2 a machine accessible medium including content that when accessed by a
3 machine causes the machine to:
4 label each received network packet with information identifying an associated
5 flow and a queue in which the packet will await transmission;
6 map each packet into one of a plurality of queues to await transmission
7 based on the packet's label identifiers;
8 schedule the packets in the queues for transmission;
9 encapsulate the packets to form frames of uniform size; and
10 transmit the uniform frames through a switch fabric to a next destination.

1 14. The article of manufacture of claim 13, wherein the machine-accessible
2 medium further includes content that causes the machine to decapsulate a received
3 frame of encapsulated packets.

1 15. The article of manufacture of claim 13, wherein the machine-accessible
2 medium further includes content that causes the machine to remove one or more
3 layer encapsulations from the received packet.

1 16. The article of manufacture of claim 13, wherein the machine accessible
2 medium including content that when accessed by the machine causes the machine to
3 label each received network packet to identify an associated flow and a queue in
4 which the packet will await transmission comprises machine accessible medium
5 including content that when accessed by the machine causes the machine to
6 determine a flow associated with the packet based on the packet's destination
7 address and protocols associated with the packet.

1 17. The article of manufacture of claim 16, wherein the machine accessible
2 medium including content that when accessed by the machine causes the machine to
3 label each received network packet to identify an associated flow and a queue in
4 which the packet will await transmission comprises machine accessible medium
5 including content that when accessed by the machine causes the machine to
6 determine a flow associated with the packet based on ports associated with the
7 packet.

1 18. The article of manufacture of claim 13, wherein the machine accessible
2 medium including content that when accessed by the machine causes the machine to
3 label each received network packet to identify an associated flow and a queue in
4 which the packet will await transmission comprises machine accessible medium
5 including content that when accessed by the machine causes the machine to
6 determine a traffic class to which the packet belongs and classify the packet into one

7 of a queue to await transmission based on the traffic class to which the packet
8 belongs.

1 19. The article of manufacture of claim 13, wherein the machine accessible
2 medium including content that when accessed by the machine causes the machine to
3 encapsulate the packets to form frames of uniform size by grouping small packets
4 and segmenting large packets comprises machine accessible medium including
5 content that when accessed by the machine causes the machine to encapsulate
6 packets to form frames of uniform size by merging multiple packets into one frame
7 using multiplexing.

1 20. The article of manufacture of claim 13, wherein the machine accessible
2 medium including content that when accessed by the machine causes the machine to
3 encapsulate the packets to form frames of uniform size by grouping small packets
4 and segmenting large packets comprises machine accessible medium including
5 content that when accessed by the machine causes the machine to encapsulate
6 packets to form frames of uniform size by segmenting a packet and placing the
7 packet segments into multiple frames using segmentation and reassembly.

1 21. A system comprising:
2 an access unit to provide access to communications from a network;
3 a switch coupled to the access unit to receive and transmit packets;
4 a classification element coupled to the switch to label packets received from
5 the network with information identifying an associated flow and queue;
6 a mapping element coupled to the classification element to place the packets
7 into one of a plurality of queues based on the label identifiers;

8 a scheduler coupled to the mapping element to schedule the packets in the
9 queues for transmission to a next destination;
10 an encapsulation element coupled to the scheduler to encapsulate the
11 scheduled packets into uniform size frames; and
12 a switch fabric coupled to the switch via which scheduled encapsulated
13 packets are transmitted to the next destination.

1 22. The system of claim 21, further comprising an adjunct unit coupled to the
2 switch to perform digital signal processing (DSP) functions.

1 23. The system of claim 21, wherein the switch is a PCI-Express/Advanced
2 Switching switch.

1 24. The system of claim 21, wherein the switch fabric is a PCI-Express/Advanced
2 Switching fabric.

1 25. The system of claim 21, wherein the switch fabric is an Ethernet fabric.

1 26. The system of claim 21, wherein the switch fabric is an InfiniBand fabric.